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Continuous Gravitational Wave Search Results from the Fourth LIGO-Virgo-KAGRA Observing Run

Abstract

Continuous gravitational waves (CWs) are a class of persistent, quasi-sinusoidal gravitational waves, which are as-yet undetected. The expected sources of CWs in the observing band of ground-based detectors are rapidly spinning neutron stars that support long-lived non-axisymmetry. A first detection of CWs could provide unprecedented insight into neutron star interiors and exotic ultra-dense nuclear matter, and potentially enable long-duration multi-messenger study of the source. In this talk, I will provide an overview of CW data analysis methods and challenges. I will then present the latest CW search results from the fourth LIGO-Virgo-KAGRA (LVK) observing run (O4), the longest and most sensitive LVK observing run to date.